

**REMARKS****Claim Status**

Claims 10-12 and 15-18 are pending after entry of this paper. Claims 10, 12, 15, 16, 18, and 19 have been rejected. Claims 11 and 17 have been withdrawn and claim 19 has been cancelled. Applicants reserve the right to pursue a withdrawn and/or cancelled claim in a divisional or continuing application.

Claims 10 has been amended to replace the phrase “by reacting” with a phrase “through a reaction.” Support may be found throughout the instant specification and claims.

Claim 15 has been amended to replace the range “0.001-1%” with the range “0.005 to 0.1%.” Support for this amendment may be found at page 11 of the specification as filed.

No new matter has been introduced by these amendments. Reconsideration and withdrawal of the pending rejections in view of the above claim amendments and below remarks are respectfully requested.

**Response to Rejections under 35 U.S.C. §102**

Claims 10, 12, 15, 16, 18 and 19 have been rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,896,918 to Yokomizo (“Yokomizo”). Applicants respectfully disagree with Examiner’s reasoning as prescribed on page 2 of the Advisory Action and the arrived conclusion that the claimed method of using a  $\beta$ -1,4-mannobiose-containing composition to inhibit the colonization of *Salmonella* in livestock and poultry is anticipated by a method for preparing a mannose-containing composition and using such compositions to inhibit

*Salmonella* described in Yokomizo. Applicants will address the Examiner's arguments in order presented in the Advisory Action.

(1) While the Examiner agrees that "the cited Yokomizo reference is silent with respect to  $\beta$ -1,4-mannobiose," the Examiner points to the applicant's own specification at page 8, lines 9 to 12 "that palm kernel meal contains  $\beta$ -1,4-mannose, hence the  $\beta$ -1,4 bond is present." Applicants do not dispute that palm kernel meal, copra meal, guar meal and the like are the mannan-containing natural materials, where mannan is a polymer (polysaccharide) consisting of a plurality of mannose units interlinked between each other via  $\beta$ -1,4 bond versus a possible  $\alpha$ -1,4 bond. The cited section, however, provides nothing beyond that, (*i.e.*, there is **no** presence of mono, di-, tri- saccharides, etc. in the mannan-containing natural materials), and such attributes of the polymer have nothing to do with a disaccharide (two subunits) of  $\beta$ -1,4-mannobiose and the use of a specific amount of the  $\beta$ -1,4-mannobiose in the claimed composition to inhibit the colonization of *Salmonella* in livestock and poultry.

The Examiner also points to col. 3, line 39 of Yokomizo, which recites that mannose or mannosides are produced when the palm kernel meal is treated with a mannan degrading enzyme. However, applicants respectfully note that this has little to do with the use of a specific amount of the  $\beta$ -1,4-mannobiose in the claimed composition to inhibit the colonization of *Salmonella* in livestock and poultry. Without employing the impermissible hindsight, Yokomizo merely provides that mannan polymer can be degraded into various subunits emphasizing the presence of singular mannose.

(2) The Examiner states that "Yokomizo . . . discloses palm kernel meal containing 1 to 30 weight% mannose having the  $\beta$ -1,4 bond, note col. 4, lines 66 to 67." Based on such evidence, the Examiner concludes that "[t]he mannbiose, having the  $\beta$ -1,4 bond

disclosed by Yokomizo is intrinsic to the substance source material, palm kernel meal, of which the enzyme is acting upon in the claimed method and cited disclosure.” As an initial matter, applicants wish to point out that there seems to be a misunderstanding of what the disclosure at col. 4, lines 66-67, in fact, provides. Yokomizo teaches that the enzymatically treated palm kernel meal contains 1-30 wt% of mannose. At most, those skilled in the art can say that the mannose has the -D- orientation of the asymmetric carbon furthest from the carbonyl group, but nothing about the position of the anomeric carbon ( $\alpha$  or  $\beta$ ), since the mannose as monosaccharide, regardless of the starting configuration of D-mannose, will gradually move towards being a mixture of  $\alpha$  and  $\beta$  anomers. Therefore, the statement that “Yokomizo . . . discloses palm kernel meal containing 1 to 30 weight% mannose *having the  $\beta$ -1,4 bond*” (emphasis added) is erroneous. The teaching of Yokomizo would only apprise those skilled in the art that the amount of mannose generated after the enzymatic treatment is 1 to 30 wt%, which is completely immaterial to the use of the composition containing the specified amount of  $\beta$ -1,4-mannobiose of the present invention.

(3) The Examiner notes that the pending claims “are not limited to the specific disaccharide per se but to a  $\beta$ -1,4-mannobiose-containing composition of which is palm kernel meal as disclosed by the Yokomizo patent.” Furthermore, the Examiner states that “[i]t would have been inevitable to obtain  $\beta$ -1,4-mannobiose composition in an effective amount of at least 3% by weight of the dry matter portion, or even 1% by weight of the same, as claimed. . . . both are disclosed by Yokomizo as discussed supra”.

Applicants respectfully assert that this observation would be applicable if the instant claims were directed to a composition, such as a composition made from the enzymatically treated palm kernel meal comprising a  $\beta$ -1,4-mannobiose, but that is not the case.

Applicants wish to remind the Examiner not to confuse the requirements for the composition claims versus the requirements for the method of using the composition claims. The instant claims are directed to a substantially different method of inhibiting *Salmonella*. On one hand, Yokomizo relies on a monosaccharide, *i.e.*, a mannose, to inhibit *Salmonella* and on the other hand, the instant claims rely on a disaccharide, *i.e.*,  $\beta$ -1,4-mannobiose, to inhibit *Salmonella*. There is no teaching in Yokomizo or the art at the time of filing to indicate to those of skill in the art that, in fact, the  $\beta$ -1,4-mannobiose is capable of inhibiting *Salmonella* until the instant disclosure. Therefore, the method of inhibiting *Salmonella* by using a composition containing at least 3 wt% of  $\beta$ -1,4-mannobiose is not and cannot be anticipated by Yokomizo that only describes the increase in production of mannose (for example see Tables 1 & 2 of Yokomizo) and relies on mannose to inhibit *Salmonella* (see cited Col. 3, lns. 45-48 of Yokomizo).

(4) The Examiner states that “[i]t would have been inevitable to obtain  $\beta$ -1,4-mannobiose composition in an effective amount of at least 3% by weight of the dry matter portion, or even 1% by weight of the same, as claimed since reacting the identical source substance with the identical enzyme, will produce the same identical product in effective amounts; both are disclosed by Yokomizo as discussed *supra*.” Applicants respectfully assert that such conclusion arrived to by the Examiner is misplaced. A mere possibility or probability is insufficient to anticipate the invention. (MPEP 2112; “Inherency . . . may not be established by probabilities or possibilities.”) The scope of the claim is defined by the amount of the  $\beta$ -1,4-mannobiose to be used in the method within the composition. Contrary to the Examiner’s above-cited statement, if the concentration of the enzyme and the reaction conditions (reaction temperature, reaction time, reaction pH, reaction scale, etc.) are different, even the identical source substance reacted with the identical enzyme cannot produce the identical product in the

same amount. For example, Table 1 (amount of mannose produced and the reaction time) of Yokomizo in col. 4 shows that the amounts of mannose produced change according to the reaction time. Further, there is a great difference in the amount of mannose produced in Example 1 of Yokomizo and the amounts of mannose produced in Examples 1 and 2 of the present invention. Finally, the amounts of  $\beta$ -1,4-mannobiose produced in Examples 1 and 2 of the present invention, and the amount of  $\beta$ -1,4-mannobiose produced in the Comparative example 1 also differ substantially. In this regard, the Applicant direct the Examiner's attention to page 5 of our previously submitted response to the Final Office Action dated November 20, 2009 and :the declaration resubmitted herewith by Mr. Futoshi Yokomizo (co-inventor of the instant application and the cited reference). Even Mr. Futoshi Yokomizo, the inventor of the cited reference, readily admits that Yokomizo reference does not disclose "a  $\beta$ -1,4-mannobiose-containing composition wherein the amount of  $\beta$ -1,4-mannobiose is at least 3% by weight of the dry matter portion of the  $\beta$ -1,4-mannobiose-containing composition" contrary to the position taken by the Examiner. Applicants respectfully assert that a mere speculation is insufficient as the basis to anticipate the claimed method of using a composition containing at least 3 wt% of  $\beta$ -1,4-mannobiose.

(5) The Examiner states that "[p]alm kernel meal contains 29 to 38 weight % of mannan, thus effective amounts of mannose or its oligosaccharides, e.g. disaccharide, can be produced through enzyme hydrolysis, note col. 3, lines 1 to 5." Applicants respectfully assert that even so it does not specifically teach "a  $\beta$ -1,4-mannobiose-containing composition wherein the amount of  $\beta$ -1,4-mannobiose is at least 3% by weight of the dry matter portion of the  $\beta$ -1,4-mannobiose-containing composition." The conclusion that Yokomizo discloses "a  $\beta$ -1,4-mannobiose-containing composition wherein the amount of  $\beta$ -1,4-mannobiose is at least 3% by

weight of the dry matter portion of the  $\beta$ -1,4-mannobiose-containing composition,” that is supposedly provided by the description of Yokomizo in col. 3, lines 1 to 5, is based on the impermissible hindsight that has no basis in the disclosure of Yokomizo.

(6) The Examiner states that “[t]he Yokomizo reference clearly teaches that *Salmonella* is inhibited using an enzymatically degraded source of mannan, note col. 2, lines 25 to 35.” However, a thorough examination of the Yokomizo reference reveals that the cited passage (col. 2, lines 25 to 35), contrary to the Examiner’s conclusion, only describes that “palm kernel meal-derived mannose [not  $\beta$ -1,4-mannobiose] is expected to have an effect to eliminate salmonella,” (emphasis added). Yokomizo is silent about the use of  $\beta$ -1,4-mannobiose to inhibit *Salmonella* and the Examiner’s conclusion has no basis in the cited art. To argue otherwise, is to refute the explicit teachings of Yokomizo to use the mannose to inhibit *Salmonella*.

(7) The Examiner alleges that “the Yokomizo reference anticipates the claimed methods of using a composition to inhibit *Salmonella*, because the reference teaches the identical substrate and enzyme source to be reacted together in a blend of animal feed and the presence of  $\beta$ -1,4-mannobiose in an amount of at least 3% by weight of the dry portion is inevitable.” Applicants respectfully refute such a conclusion because treating the method claims the same way as the composition claims is improper. In order to teach a method of inhibiting *Salmonella*, Yokomizo must explicitly describe the use of  $\beta$ -1,4-mannobiose to inhibit the *Salmonella* as opposed to a composition claim where the inherency can be established as suggested by the Examiner. But Yokomizo fails to do so. In fact, as described in section 8, Yokomizo teaches away from using  $\beta$ -1,4-mannobiose to inhibit *Salmonella* because Yokomizo emphasizes the use of the mannose. One skilled in the art would have to perform a great deal of undue experimentation in order to arrive at the claimed invention. The enzymatic decomposition

product of Palm Kernel Meal disclosed in Yokomizo, contains plethora of different compounds such as arabinose, galactose, glucose, xylose, fructose, etc (see Table 2 of Yokomizo). The Examiner has not demonstrated why one skilled in the art would consider using at least 3% by weight of  $\beta$ -1, 4-mannobiose as opposed to any other components of the enzymatic decomposition product of Palm Kernel Meal. The Examiner's conclusion appears to be based on the impermissible hindsight attained from the instant disclosure.

Hence, for at least the above-mentioned reasons, applicants assert that the express, implicit or inherent disclosure of Yokomizo does not teach the  $\beta$ -1,4-mannobiose-containing composition of the present invention where the  $\beta$ -1,4-mannobiose content is at least 3% by weight of the dry matter portion of the composition. Furthermore, Yokomizo does not describe that the blended feed comprising the mixture of the  $\beta$ -1,4-mannobiose composition is used to inhibit *Salmonella* colonization in livestock and poultry. Since "[a] claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference" (M.P.E.P. § 2131; emphasis added), applicants respectfully request reconsideration and withdrawal of the 35 U.S.C. 102(e) rejections to the claims in view of the above-mentioned remarks.

#### Dependent Claims

The applicant has not independently addressed all of the rejections of the dependent claims. The applicant submits that for at least similar reasons as to why independent claims 10 and 16 from which all of the dependent claims 12, 15, and 18 depend are believed allowable as discussed *supra*, the dependent claims are also allowable. The applicant however, reserves the right to address any individual rejections of the dependent claims and present

independent bases for allowance for the dependent claims should such be necessary or appropriate.

Thus, applicant respectfully submits that the invention as recited in the claims as presented herein is allowable over the art of record, and respectfully request that the respective rejections be withdrawn.

### **CONCLUSION**

Based on the foregoing amendments and remarks, Applicants respectfully request reconsideration and withdrawal of the rejection of claims and allowance of this application.

Favorable action by the Examiner is earnestly solicited.



**AUTHORIZATION**

The Commissioner is hereby authorized to charge any additional fees which may be required for consideration of this Amendment to Deposit Account No. **50-4827**, Order No. 1004334.003US.

In the event that an extension of time is required, or which may be required in addition to that requested in a petition for an extension of time, the Commissioner is requested to grant a petition for that extension of time which is required to make this response timely and is hereby authorized to charge any fee for such an extension of time or credit any overpayment for an extension of time to Deposit Account No. **50-4827**, Order No. 1004334.003US.

Respectfully submitted,  
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